RITTAL TOP THERM

SK 3302.300
SK 3302.310
SK 3361.xxx
SK 3366.xxx
SK 3377.xxx

Schaltschrank-Kühlgerät

Cooling unit

Climatiseur

Koelaggregaat

Kylaggregat

Condizionatore per armadi

Refrigerador para armarios

エンクロージャー用クーリングユニット

Montage- und Bedienungsanleitung

Assembly and operating instructions

Notice de montage et mode d'emploi

Montage- en bedieningshandleiding

Montage- och bruksanvisning

Istruzioni di montaggio e uso

Instrucciones de montaje y empleo

取扱説明書

FRIEDHELM LOH GROUP

RITTAL®

SK 3302.3xx

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Fig. 3.1 Coupe de montage rapporté
Afb. 3.1 Montage-uitsparing aanbouw
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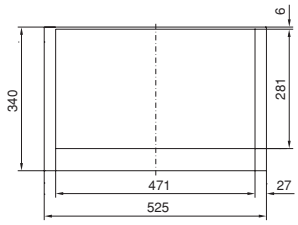
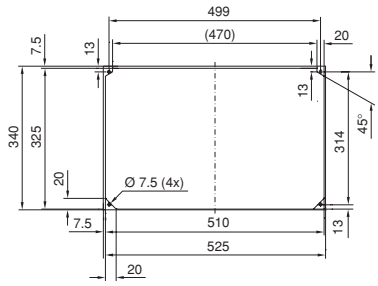
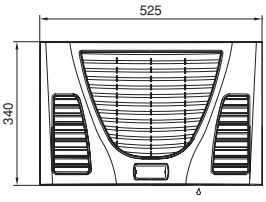
Coupe de montage installation
Montage-uitsparing inbouw
Montageavsnitt inbyggnad
Montaggio incassato
Recorte de montaje interior
取付けカットアウト図 全埋め込み取付け







Anbau
External installation
Installation externe
Aanbouw
Utanpå
Sporgente
Montaje exterior
表面取付け

Einbau
Internal installation
Installation interne
Inbouw
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SK 3361.xxx

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Montage-uitsparing gedeelt. inbouw
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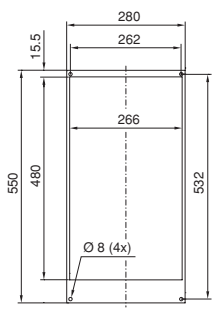
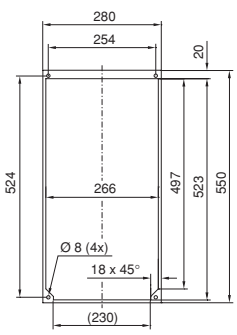
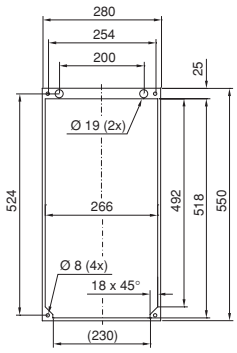
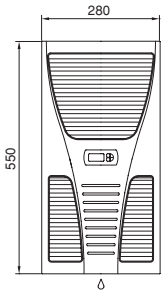
Montaggio semincassato
Recorte de montaje interior parcial
取付けカットアウト図 半埋め込み取付け

Montageausschnitt Einbau
Mounting cut-out for internal mounting
Coupe de montage installation
Montage-uitsparing inbouw
Montageavsnitt inbyggnad
Montaggio incassato
Recorte de montaje interior
取付けカットアウト図 全埋め込み取付け





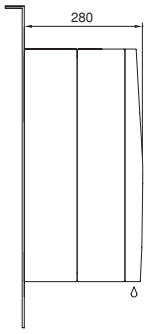


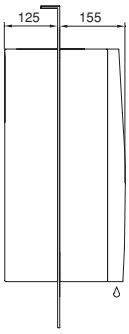


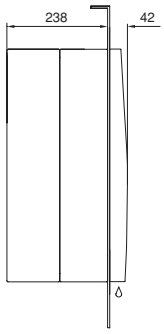
Anbau
External installation
Installation externe
Aanbouw
Utanpå
Sporgente
Montaje exterior
表面取付け

Teileinbau
Partial internal mounting
Rapporté partiel
Gedeelt. inbouw
Delinbyggnad
Semincassato
Interior parcial
半埋め込み取付け

Einbau
Internal installation
Installation interne
Inbouw
Inbyggnad
Incassato
Montaje interior
全埋め込み取付け







SK 3366.xxx / SK 3377.xxx

Abb. 3.1 Montageausschnitt Anbau
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Afb. 3.1 Montage-uitsparing aanbouw
Bild 3.1 Montageavsnitt påbyggnad
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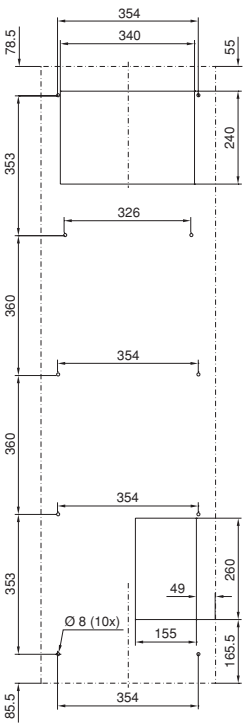
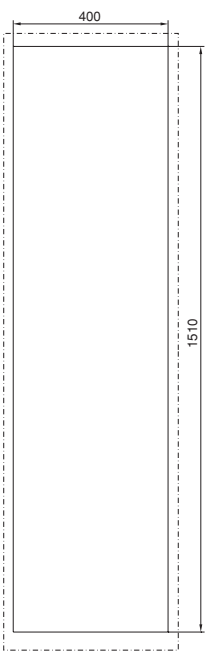
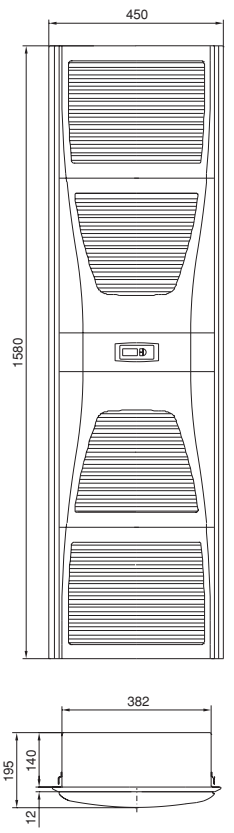
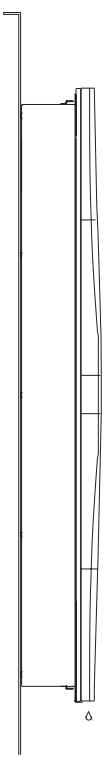


Montageausschnitt Einbau
Mounting cut-out for internal mounting
Coupe de montage installation
Montage-uitsparing inbouw
Montageavsnitt inbyggnad
Montaggio incassato
Recorte de montaje interior
取付けカットアウト図 全埋め込み取付け





Anbau
External installation
Installation externe
Aanbouw
Utanpå
Sporgente
Montaje exterior
表面取付け



Einbau
Internal installation
Installation interne
Inbouw
Inbyggnad
Incassato
Montaje interior
全埋め込み取付け

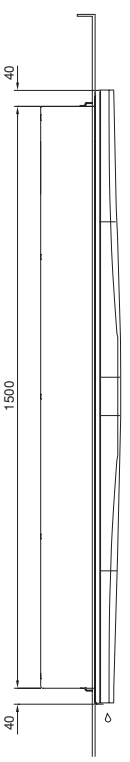
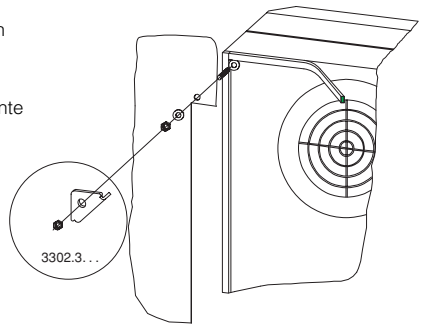
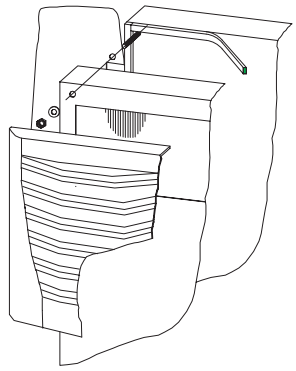


Abb. 3.2 **Gerätemontage**
Fig. 3.2 **Mounting**
Fig. 3.2 **Montage de l'appareil**
Afb. 3.2 **Apparaatmontage**
Bild 3.2 **Aggregatmontage**
Fig. 3.2 **Montaggio dell'apparecchio**
Fig. 3.2 **Montaje del aparato**
図3.2 **取付けカットアウト図**

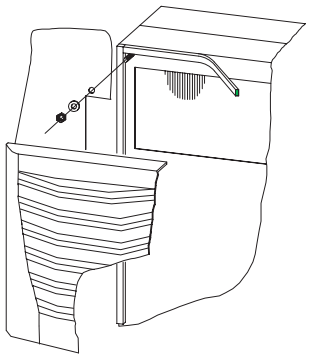
Anbau
External installation
En saillie
Aanbouw
Utanpå
Montaggio sporgente
Montaje exterior
表面取付け



Teileinbau
Partially internal installation
Partiellement intégré
Gedeeltelijke inbouw
Delvis inbyggnad
Montaggio semincassato
Montaje parcial
半埋め込み取付け



Einbau
Internal installation
Intégré
Inbouw
Inbyggnad
Montaggio incassato
Montaje interior
全埋め込み取付け



SK 3366.xxx / SK 3377.xxx
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Fig. 3.2.1 **Mounting**
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Afb. 3.2.1 **Apparaatmontage**
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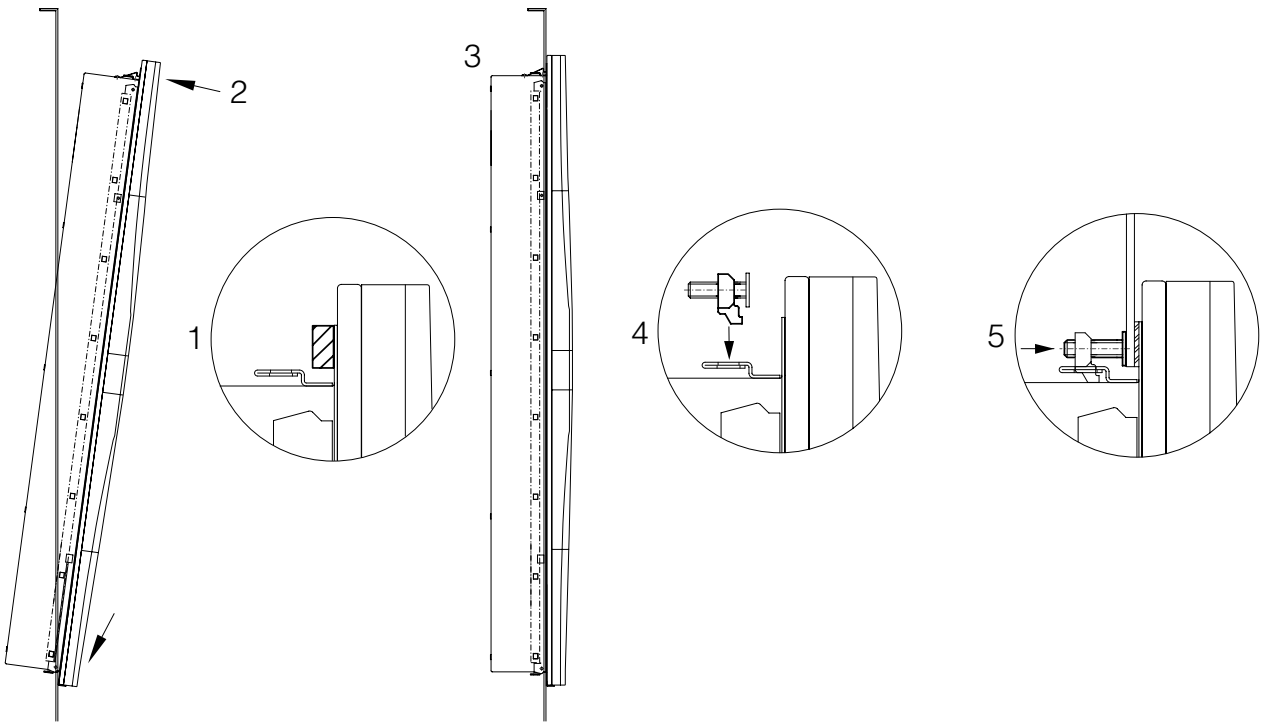

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表2.1 **仕様**

D	Farbton RAL 7035	Edelstahlhaube 1.4301	Bemessungs-spannung	Bemes-sungs-strom	Anlauf-strom	Vor-siche-rung T	Einschalt-dauer	Bemessungs-leistung	Nutzkühlleistung	Kältemittel	zul. Druck PS	Temperatur-bereich	Geräusch-pegel	Schutzart Innenkreislauf Außenkreislauf	Abmessungen (B x H x T) mm	Gewicht
GB	Colour RAL 7035	Stainless steel cover 1.4301	Operating voltage	Rated current	Starting current	Pre-fuse T	Duty cycle	Power consumption	Useful cooling output	Refrigerant	Permis-sible pressure	Temperature range	Noise level	Protection categ. Internal circuit External circuit	Dimensions (W x H x D) mm	Weight
F	Coloris RAL 7035	Capot en acier inoxydable 1.4301	Tension nominale	Courant nominal	Courant de démarrage	Dispositif de sécurité T	Durée de mise en circuit	Puissance nominale	Puissance frigorifique de régime	Fluide frigori-gène	Pression de régime autor.	Plage de température	Niveau sonore	Degré de protect. Circuit intérieur Circuit extérieur	Dimensions (L x H x P) mm	Poids
NL	Kleur RAL 7035	RVS mantel 1.4301	Bedrijfs-spanning	Nominale stroom	Aanloop-stroom	Primaire zekering T	Inschakel-duur	Nominaal vermogen	Nuttig koelvermogen	Koel-middel	p. max.	Temperatuur-bereik	Geluids-nivo	Beschermklasse Inwendig circuit Uitwend. circuit	Afmetingen (B x H x D) mm	Gewicht
S	Färgton RAL 7035	Huv i rostfritt stål 1.4301	Anslutnings-spänning	Märk-ström	Startström	För-säkring gL	Inkopp-lingstid	Märkeffekt	Effektiv kyleffekt	Kylmedel	Tillåtet drifts-övertryck	Temperatur-område	Ljudnivå	Kapslingsklass Inre kretslopp Yttre kretslopp	Mått (B x H x D) mm	Vikt
I	Colore RAL 7035	Cover in acciaio inox 1.4301	Tensione nominale	Corrente nominale	Corrente di spunto	Fusibili T	Ciclo d'inser-zione	Potenza nominale	Potenza frigorifera utile	Fluido frigorigeno	Pressione max.	Campo di temperatura	Livello di rumore	Grado di protez. Circuito interno Circuito esterno	Dimensioni (L x A x P) mm	Peso
E	Color RAL 7035	Cubierta de acero inoxidable 1.4301	Tensión de servicio	Intensidad nominal	Intensidad de arranque	Fusible T	Duración de conexión	Potencia nominal	Potencia frigorífica útil	Fluido frigorífico	Presión máxima admis.	Campo de temperaturas	Nivel de ruido	Protección Circuito interior Circuito exterior	Dimensiones (anch. x alt. x prof.) mm	Peso
J	塗装色 RAL 7035	ステンレス製カバー 1.4301	定格電圧	定格電流	始動電流	ブリヒューズ	負荷サイクル	定格電力	有効冷却能力	冷媒	最大圧力	使用温度範囲	ノイズレベル	保護等級 内部循環 外部循環	外形寸法 幅×高さ×奥行き	質量
								L35 L35 L35 L50	DIN 3168/EN 814 L35 L35 L35 L50					EN 60529		
SK 3302.310 **SK 3302.300**		**SK 3302.330** **SK 3302.320**	115 V, 60 Hz 230 V, 50/60 Hz	4.0 A 1.6 A/ 1.7 A	12.0 A 4.3 A/ 5.3 A	10.0 A 10.0 A/ 10.0 A	100 %	290 W/ 340 W 285 W/ 300 W 320 W/ 340 W	300 W/320 W 150 W/160 W	95 g, R134 a 100 g, R134 a	25 bar	+ 20 – + 55 °C	< 62 dB (A)	IP 54/IP 34	525 x 340 x 153	13 kg
SK 3361.100 **SK 3361.500**		**SK 3361.200** **SK 3361.600**	230 V, 50/60[1] Hz	2.3 A/ 2.4 A	5.6 A/ 5.6 A	10.0 A/ 10.0 A		480 W/ 550 W 530 W/ 640 W		280 g, R134 a						
SK 3361.110 **SK 3361.510**		**SK 3361.210** **SK 3361.610**	115 V, 60[1] Hz	5.3 A	12.0 A	10.0 A	100 %	570 W 670 W	750 W/780 W 510 W/540 W	260 g, R134 a	28 bar	+ 20 – + 55 °C	< 64 dB (A)	IP 54/IP 34	280 x 550 x 280	22 kg
SK 3361.140 **SK 3361.540**		**SK 3361.240** **SK 3361.640**	400 V[2], 2 ~, 50/60[1] Hz	1.2 A/ 1.4 A	3.1 A/ 3.3 A	10.0 A/ 10.0 A		480 W/ 550 W 530 W/ 640 W		280 g, R134 a						
SK 3366.100 **SK 3366.500**		**SK 3366.200** **SK 3366.600**	230 V, 50/60 Hz	6.5 A/ 6.7 A	22.0 A/ 24.0 A	10.0 A/ 10.0 A		920 W/1050 W 1095 W/1210 W	1500 W/1500 W 1050 W/1100 W							45 kg
SK 3366.110 **SK 3366.510**		**SK 3366.210** **SK 3366.610**	115 V, 50/60 Hz	13.2 A/ 13.6 A	43.0 A/ 47.0 A	20.0 A/ 20.0 A	100 %	950 W/1100 W 1120 W/1290 W		700 g, R134 a	28 bar	+ 20 – + 55 °C	62 dB (A)	IP 54/IP 34	400 x 1580 x 195	49 kg
SK 3366.140 **SK 3366.540**		**SK 3366.240** **SK 3366.640**	400 V, 3 ~, 50/60 Hz, 460 V, 3 ~, 60 H	2.6 A/ 2.8 A	8.0 A/ 8.8 A	10.0 A/ 10.0 A		920 W/1050 W 1095 W/1210 W	1500 W/1500 W 980 W/1080 W							46 kg
SK 3377.100 **SK 3377.500**		**SK 3377.200** **SK 3377.600**	230 V, 50/60 Hz	6.5 A/ 6.7 A	22.0 A/ 24.0 A	10.0 A/ 10.0 A		920 W/1050 W 1095 W/1210 W	1500 W/1500 W 1050 W/1100 W							45 kg
SK 3377.110 **SK 3377.510**		**SK 3377.210** **SK 3377.610**	115 V, 50/60 Hz	13.2 A/ 13.6 A	43.0 A/ 47.0 A	20.0 A/ 20.0 A	100 %	950 W/1080 W 1140 W/1250 W		700 g, R134 a	28 bar	+ 20 – + 55 °C	< 64 dB (A)	IP 54/IP 34	400 x 1580 x 195	49 kg
SK 3377.140 **SK 3377.540**		**SK 3377.240** **SK 3377.640**	400 V, 3 ~, 50/60 Hz, 460 V, 3 ~, 60 H	2.6 A/ 2.8 A	8.0 A/ 8.8 A	10.0 A/ 10.0 A		950 W/1100 W 1120 W/1290 W	1500 W/1500 W 980 W/1080 W							46 kg
SK 3366.101 **SK 3366.501**		**SK 3366.201** **SK 3366.601**	230 V, 50/60 Hz	7.1 A/ 7.3 A	22.0 A/ 24.0 A	10.0 A/ 10.0 A		1045 W/1175 W 1220 W/1335 W	1500 W/1500 W 1050 W/1100 W							45 kg
SK 3366.111 **SK 3366.511**		**SK 3366.211** **SK 3366.611**	115 V, 50/60 Hz	14.3 A/ 14.7 A	43.0 A/ 47.0 A	20.0 A/ 20.0 A	100 %	1075 W/1200 W 1265 W/1375 W		700 g, R134 a	28 bar	+ 20 – + 55 °C	< 64 dB (A)	IP 54/IP 34	400 x 1580 x 195	49 kg
SK 3366.141 **SK 3366.541**		**SK 3366.241** **SK 3366.641**	400 V, 3 ~, 50/60 Hz, 460 V, 3 ~, 60 Hz	3.3 A/ 3.4 A	8.0 A/ 8.8 A	10.0 A/ 10.0 A		1190 W/1340 W 1360 W/1530 W	1500 W/1500 W 980 W/1080 W							46 kg

Technische Änderungen vorbehalten. Technical modifications reserved. Sous réserve de modifications techniques. Technische wijzigingen voorbehouden.
Tekniska ändringar förbehålles. Rittal si riserva di apportare eventuali modifiche tecniche. Se reserva el derecho a realizar cambios técnicos.
* Motorschutzschalter, motor circuit breaker, disjoncteur-protecteur, motorbeveiligingsschakelaar, motorskyddsbrytare, salvamotore, guardamotor.
1) T_u max = 52°C/60 Hz
2) Externer Ringkerntrafo d = 126 x t = 65 mm zur Montage im Schrank

English

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1. Application
2. Technical data
3. Wall mounting
4. Safety notices
5. Electrical connection
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7. Supplementary functions
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12. Display screen and system analysis
13. Comfort control programming

1. Application

Enclosure cooling units are designed and built to dissipate heat from enclosures by cooling the air inside the enclosure and protecting temperature-sensitive components. Enclosure cooling units are particularly suitable for a temperature range of +40°C to +55°C.

2. Technical data

(see table 2.1)

3. Wall mounting

According to production model, the wall-mounted unit can be mounted, installed, or partially installed, to choice (up to SK 3302.xxx, SK 3366.xxx and SK 3377.xxx). Cut out the sections and drill according to Fig. 3.1 at the fitting level.

3.1 Mounting
Cut the enclosed seals to the required length and attach to the unit in accordance with Fig. 3.2. Screw tapped pins into the blind nuts on the rear of the unit. The unit is then to be secured using washers and nuts.
Equipment can only be mounted on the SK 3366.xxx and SK 3377.xxx using panel frames (see accessories).

3.2 Installation
First of all, the lamellar grid and belt are to be removed. The plug is to be removed from the display screen on the inner side of the belt. Cut the enclosed seals to the required length and attach to the unit in accordance with Fig. 3.2. Loosen the nuts and washers, then fasten the unit to the enclosure with the washers and nuts. On the SK 3302.xxx attach the seal to the partition/ sheet steel wall along the cutout aperture.

3.2.1 Rapid Mounting Installation
Attach the enclosed seal to the SK 3366.xxx / SK 3377.xxx along the edge of the housing, insert the cooling unit in the mounting cutout and push the unit until it snaps in place. Insert the clamps into the perforated rails and tighten the screw (Fig. 3.2.1).

3.3 Partial installation (only SK 3361.xxx)
For partial installation the unit cover is to be separated from the chassis. First of all, remove the lamellar grid and belt. Carefully disconnect the plug from the display screen. Loosen the 4 nuts and washers of the cover. Pull the cover a little bit to the front. Disconnect the safety connection between cover and chassis and separate the plug-in connection for the fan. Remove the unit cover completely. Loosen the 4 spacer bolts from the chassis. Attach the enclosed seal all-round along the edge of the chassis (see Fig. 3.2). Slide the chassis into the mounting cut-out and screw-fasten with 4 spacer bolts. It is now fitted to the enclosure in reverse sequence.

4. Safety notices

The following safety notices are to be observed in their entirety for the correct use of the equipment:

- To prevent the enclosure with the cooling unit fitted tipping over, it is essential that this be bolted to the floor.
- A roller door is to be used to ensure problem-free opening and closing of the enclosure door.
- A transportable enclosure with built-in cooling unit may only be produced if an additional transport anchorage to support the cooling unit is used.

Prior to mounting, ensure that:

- the site for the enclosure, and hence the arrangement of the cooling unit, is selected so as to ensure good ventilation;
- the location is free from excessive dirt and moisture;
- the cutout for air extraction is located in the upper area of the enclosure;
- the mains connection ratings, as stated on the rating plate, are available;
- the ambient temperature does not exceed +55°C;
- the packaging shows no signs of damage. Traces of oil on damaged packaging are an indication of refrigerant loss and of leakage in the unit system. Any damage to the packaging may be the cause of subsequent malfunctions;
- the enclosure is sealed on all sides (IP 54). Condensation will occur if the enclosure is leaky;
- the separation of the units from one another and from the wall should not be less than 200 mm;
- air inlet and outlet are not obstructed on the inside of the enclosure;
- units are only fitted horizontally in the specified position.
  Max. deviation from the true horizontal: 2°;
- condensate drainage is provided (see 9.3);
- electrical connection and repair are carried out only by authorised personnel.
- Use only original replacement parts and accessories.
- plugs must not be connected or disconnected while live or loaded;
- to avoid an increase in condensation, a door-operated switch (e.g. PS 4127.000) should be used which will switch the cooling unit off when the enclosure door is opened (see 7.3);
- losses from the components installed in the enclosure must not exceed the specific refrigeration capacity of the cooling unit itself;
- the customer must not modify the cooling unit in any way.

5. Electrical connection

The connected voltage and frequency must correspond to the values stated on the rating plate. During commissioning, the data on the rating plate of the device shall apply. The cooling unit must be connected to the mains via an all-pin isolating device which ensures at least 3 mm contact opening when switched off. The unit must not have any additional temperature control connected up-stream at the supply end. The fans and compressors built into single and three-phase devices are intrinsically safe (thermal winding protection).
This also applies to SK 3302.xxx and SK 3361.xxx transformer types, and to specially rated units which are also fitted with a transformer.
Line protection should be provided by means of the pre-fuse specified on the rating plate. Only one automatic cutout should be connected between the cooling unit and the power supply. A time-lag backup-fuse as specified on the rating plate (safety cutout K-characteristic or time-lag lead fuse) is mandatory. Observe the relevant regulations during installation!

The three phase supplies for the SK 3366.xxx and SK 3377.xxx must be connected via a motor safety switch to a TN grid with grounded star point.
Summation current as specified on the rating plate. Specially rated three-phase units must be protected by means of transformer safety switches (category AC-6A) specified on the rating plate.
For units designed for three phase 400/460 V, the rotary field or the absence of a phase is also monitored. If the rotary field is incorrect or a phase is absent, the unit will not run.
The cooling unit does not have its own surge protection. Surge protection must be provided by the operator in the power supply wiring, including both lightning and power surge protection. The power supply voltage must not deviate from the tolerances by any more than +/–10 %.
In accordance with IEC 61 000-3-11, the unit is intended solely for use at sites with a continuous current-carrying capacity (incoming mains power supply) > 100 A per phase and with a supply voltage of 400/230 V. If necessary, the power supply company must be consulted to ensure that the continuous current-carrying capacity at the point of connection to the public grid is sufficient for connection of the unit. The chosen mains connection form must guarantee low-noise equipotential bonding.
Observe the relevant regulations during installation!

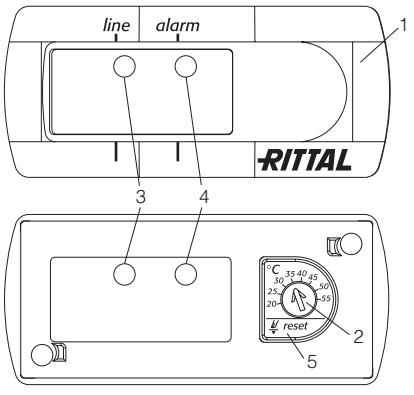
6. Commencing operation and control behaviour

Following the completion of mounting and a waiting period of approximately 30 minutes (to allow oil to collect in the compressor in order to ensure lubrication and cooling).

6.1 Basic control system
Version . . . . .100 / .110 / .140 / .300 / .310
The cooling unit operates automatically, i.e. after electrical connection, the evaporator fan will run continuously to circulate the air inside the enclosure. The installed basic controller (setting the desired internal temperature; factory setting +35°C) provides automatic control switch-off of the cooling unit by the set value of the fixed switching difference of 5 K.

6.1.1 Temperature setting at the basic controller
First of all, the lamellar grid and belt with the incorporated display is to be removed from the unit. The display lock is then to be slackened and this is to be pushed forward off the lamellar grid/ belt. Finally, the display screen (1) is carefully removed, e.g. with a screwdriver. The desired nominal temperature can be set on the potentiometer (2) which is now accessible. After the temperature has been set, the display of all screens in the lamellar grid is to be locked once more. The lamellar grid and belt are to be fastened to the unit again.

Fig. 6.1 **Basic controller**



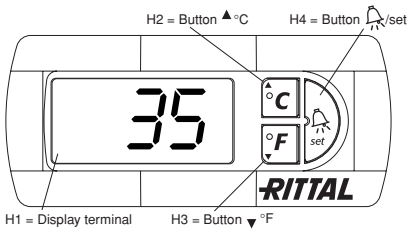
6.1.2 Operation of the basic controller
The basic controller monitors and controls the cooling unit. After the supply voltage has been connected, the green LED (3) lights to indicate readiness for operation. The green LED is connected in series with a door limit switch, and flashes if the enclosure door is opened. The red LED (4) signals too high a temperature inside the enclosure; at 5 K above the set value, the red LED comes on permanently. In addition, the excess temperature message can still be queried via an integrated potential-free contact in the cooling unit connection terminal.
K1 fault signal relay with changeover contact
Terminal 3: NC (normally closed)
Terminal 4: C (connection between voltage supply and fault signal relay)
Terminal 5: NO (normally open)
The definitions NC and NO refer to the de-energised state. As soon as voltage is applied to the cooling unit, the fault signal relay picks up. As a result, the relay contacts change their state (contact 3 – 4 open; contact 4 – 5 closed), representing the normal operating status of the cooling unit. As soon as a system message occurs or the voltage supply is interrupted, the relay drops out. (see also circuit diagrams on page 39).
The high pressure alarm in the cooling circuit is indicated by the red LED flashing. In this case, the unit is to be reset manually, by pressing the rubberised potentiometer display (5) for 3 seconds (see 6.1.1).

If the red LED flashes on the SK 3302.xxx, check the plug connector on the board and replace if necessary.

Test mode
By holding down the potentiometer for 5 seconds, the cooling unit will commence cooling operation, irrespective of the setpoint.

6.2 Comfort controller control
Version . . . . .500 / .510 / .540

Fig. 6.2 **Comfort controller**



After electrical connection the internal fan turns on and circulates the enclosure air. This helps assure even temperature distribution within the enclosure. The condenser fan and compressor are controlled by the Comfort controller. The minimum break time is 3 min. The switching difference is 5 K, but can be set in the range 2 – 10 K. To avoid short switching cycles and hence the danger of inadequate or only partial cooling in some sections of the enclosure, the switching difference should be set to be only as low as necessary. For economic reasons (energy saving), the nominal value of the internal enclosure temperature T_i should also be set to be only as low as necessary.

6.2.1 Operation of the Comfort controller (see diagram 13.1 Programming)
The display terminal H1 consists of a 3 position 7-segment display which indicates the internal enclosure temperature in °C or °F (changeable) as well as any fault codes. The actual enclosure internal temperature is constantly displayed on H1. When a system message is generated, this alternates in the display with the current internal enclosure temperature. While programming the unit, the programming level and prescribed value are also displayed.

Test mode
By simultaneously holding down keys H2 (▲°C key) and H4 (/set key) for 5 seconds, the cooling unit will commence cooling operation, irrespective of the setpoint. The door limit switch function is disregarded in such cases. After approximately 5 minutes or upon reaching 15°C, the device deactivates cooling operation once again.

6.2.2 Programming (see 13.1 Comfort controller programming)
In the EEPROM of the Comfort controller various parameters are stored which can be changed by using the buttons H2, H3 and H4. 24 changeable parameters can be set via 24 programme levels in the stated ranges (max. and min. values).
To this end, input code “22” is required (see diagram 13.1).
The H2, H3 and H4 keys are multiple occupancy. To access programming mode, set 5 sec is to be pressed and held down.
Primary occupancy (only diode displays):
H2: °C, H3: °F, H4: Alarm
Secondary occupancy (for programming):
H2: Arrow upwards, H3: Arrow downwards, H4: set
Programming via diagnostic software (Model No. SK 3159.100) is also an option. The programming cable interface is the connecting cable plug, located on the rear of the Comfort controller. To do this, the lamellar grid and the belt also are to be removed if necessary.

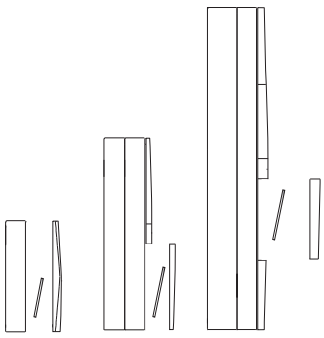
6.2.3 System messaging equipment
All system messages at the cooling unit are recorded and displayed as an error number by H1. System messages alternate in the display with the current internal enclosure temperature. (see 12. Comfort control fault display and error analysis).

6.2.3.1 System message contacts (K1 and K2; potential free)
Both relays are normally closed. All system messages assigned to an individual relay result in it opening. If the control voltage fails, this also results in the relay opening and can hence be captured and documented in the log file. According to individual weighting, all system messages can be assigned to both relays or suppressed. Terminal strip X3 provides the connection. See the wiring diagram for contact data and occupancy.
K1/K2 fault signal relay (normally open contact):
Terminal 3: Fault signal relay 2
Terminal 4: Voltage supply connection for both fault signal relays
Terminal 5: Fault signal relay 1
(see circuit diagrams on page 39).

7. Supplementary functions

7.1 Filter mat use and changing
The PU foam filter mat available as an accessory is coarse and filters large dust particles or fluff from the air. Metallic filter mats are used to trap oil condensate. These are also available as an accessory. Subject to the suction of the blower being high enough, fine dust is blown through the filter mat and the external circuit of the unit. This does not affect the unit’s operation.

Fig. 7.1 **Filter mat replacement**



7.2 Filter mat monitoring
Function of the filter mat monitor:
The filter mat is monitored for soiling by measuring the temperature difference in the external circulation of the cooling unit (see Diagram 13.1: Programming on page 47). In the event of any filter mat soiling, the temperature difference will increase. The nominal value of the temperature difference in the external circuit is matched to the relevant operating points in the characteristic fields. Hence there is no requirement to adjust the nominal value for different unit operating points.

7.3 Door limit switch S1 (supplied by customer)
Where a door limit switch is used and the enclosure door is open (contact is closed when door is open), the cooling unit (fans and condenser) will switch off after approx. 15 s. This only applies to devices with a Comfort controller and devices with a three-phase connection to the basic controller. For devices with a basic controller (115 V, 230 V and 400 V, 2~), the internal fan is not switched off when using a door limit switch. Thereby avoiding an increase in condensation while the door is open. To avoid cyclic operation, switch-on of condenser and external fan is delayed by about 3 minutes after the cooling unit has been switched off.
The internal fan will start up after about 15 s. on closure of the door. Connection is made at the terminals 1 and 2. The extra low voltage is supplied by the internal power pack, current is approx. 30 mA DC. Each door limit switch must only be assigned to one cooling unit. Several door limit switches may be operated on one cooling unit (parallel connection). The minimum cross-section of the connection cable is 0.3 mm^2 for a cable length of 2 m. The resistance of the door limit switch contact must not exceed a maximum of 50 Ω.
Connect the door limit switch free from potential only, no external voltage!

7.4 Interface X3 (option) (Connector X3)

Note!
The electrical signals at the interface are of an extra-low voltage (not extra-low safety voltages to EN 60 335).

The 9-pin SUB-D connector X3 can be used to connect additional interface cards for integrating cooling units with higher level monitoring systems. These cards are also available as an accessory.
(Model No.: Interface card SK 3124.200).

8. BUS system

(Model No.: Master-slave cable SK 3124.100)

8.1 General
The BUS system allows a maximum of 10 cooling units to be interconnected.
As a result, the following functions are available to the operator:
- Parallel unit control (the cooling units in the network can be simultaneously switched on and off)
- Parallel door status messages (“door open”)
- Parallel collective fault message

The data exchange is carried out using master-slave cables (shielded, two-wire leads). All units are assigned an address. This address also includes the ID for “master” or “slave”.

8.2 Installation notices for the X2 interface (Jack X2)

Note!
The electrical signals at the interface are of an extra-low voltage (not extra-low safety voltages to EN 60 335). Always heed the following notes!

- De-energise the cooling units to be connected.
- Ensure proper electrical insulation.
- Make sure the cables are not laid in parallel to power lines.
- Make sure that the lines are short.

8.3 Programming the cooling unit

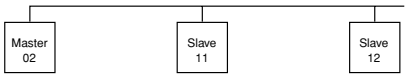
See diagram 13.1 for details on programming.

ID’s:

Master cooling unit		Slave cooling unit	
00	Basic state	00	Basic state
01	Master with 1 slave	11	Slave with address 1
02	Master with 2 slaves	12	Slave with address 2
03	Master with 3 slaves	13	Slave with address 3
04	Master with 4 slaves	14	Slave with address 4
05	Master with 5 slaves	15	Slave with address 5
06	Master with 6 slaves	16	Slave with address 6
07	Master with 7 slaves	17	Slave with address 7
08	Master with 8 slaves	18	Slave with address 8
09	Master with 9 slaves	19	Slave with address 9

Note
Only one unit may be configured as master; the address ID must match the number of slave units.
The individual slave units must have different addresses; the addresses must be in ascending order (without gaps in between).

Example:
1 master cooling unit with 2 slave cooling units



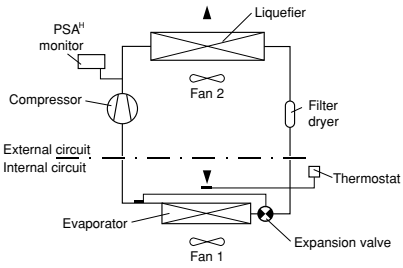
English

9. Technical information

The cooling unit (compressor refrigeration unit) consists of four main components: the coolant compressor, evaporator, condenser, and the control or expansion valve, which are connected by suitable pipework. This circuit is filled with a readily boiling substance, the refrigerant. The R134a (CH_2FCF_3) refrigerant is free from chlorine. It has an ozone destroying potential (ODP) of 0 and is therefore environmentally friendly. A filter dryer which is integrated in the hermetically sealed cooling circuit, provides effective protection against moisture, acid, dirt particles, and foreign bodies within the cooling circuit.

9.1 Operation of the cooling unit

Fig. 9.1 **Operation of the cooling unit**



The compressor takes the gaseous refrigerant from the evaporator and compresses it to a higher pressure in the condenser. During this process the temperature of the refrigerant rises above the ambient temperature and heat can be dissipated to the environment via the surface of the condenser. Then the refrigerant is liquefied and, by means of a thermostatically controlled expansion valve, returned to the evaporator, where it evaporates at low pressure. The heat required for complete evaporation is drawn from the enclosure interior causing it to cool down. The cooling cycle is thus completed, the aforementioned process of the heat transfer starts afresh.

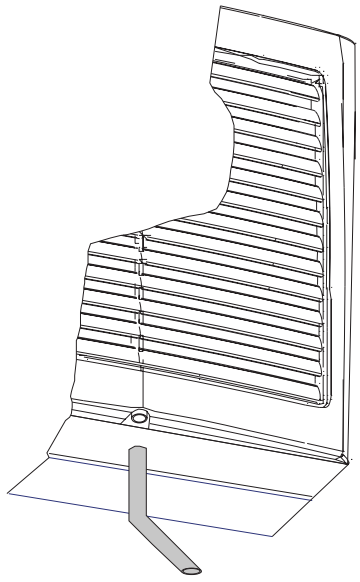
9.2 Safety equipment

The cooling circuit of the cooling unit has a component-tested, high-pressure monitor to EN 12 263, which is set to maximum PS (allowed pressure) and operates via an automatic reset device in case of recurring pressure drop. Temperature monitoring will prevent the evaporator from icing up. If there is a risk of icing up, the compressor is switched off and automatically switched on again at higher temperatures. The refrigerant compressor and the fans are equipped with thermal winding protection switches against excess current and excess temperatures.

9.3 Condensate discharge

A drain pipe fitted to the evaporator divider panel ensures that any condensate which may form on the evaporator (at high air humidity, low temperatures inside the enclosure) is drained away from the bottom of the unit. For this purpose, a length of hose should be fitted to the condensate pipe connection piece (see Fig. 9.3, if appropriate, remove the grille). The condensate must be able to run off freely. If the condensate is to be drained off over a greater distance, then care must be taken that the hose is free from kinks and a check for correct drainage made.

Fig. 9.3 **Condensate discharge**



9.4 Electronic evaporation

The SK 33xx.xx1 cooling units possess an automatic electronic condensate evaporation feature. Any condensate formed (see 9.3) is collected in the external circuit of the cooling unit. In the case of excessive condensate formation, the evaporation function is activated via a separate heating cartridge. The direct evaporation principle provides for effective evaporation. The relevant safety notes (see Point 4.) must be observed!

10. Handling Instructions

Storage, maintenance, transport and disposal

As a maintenance-free, hermetically sealed system, the cooling circuit has been filled in the factory with the required amount of refrigerant, and tested for leaks and subjected to a function trial run.
The installed maintenance-free fans use ball bearings, they are protected against moisture and dust, and are fitted with a temperature monitor. The life expectancy is at least 30,000 operating hours. The cooling unit is thus largely maintenance free. All that may be required from time to time is that the components of the external air circuit are cleaned by compressed air. The use of a filter mat is recommended only if large particles of lint are present in the air, so that blockage of the condenser is prevented. (Filter mat replacement, Fig. 7.1).
The unit cover on the SK 3366.xxx and SK 3377.xxx can be removed for maintenance and cleaning work. Firstly, of all, remove the lamellar grid and belt and disconnect the cable from the display. Unscrew the retaining screw behind the top lamellar grid and push the cover upwards. Disconnect the earth conductor and pull the plug to the external fan.
Note: Prior to any maintenance work, the power to the cooling unit must be disconnected.

Storage temperature: The cooling units must not be exposed to temperatures above +70°C.
Transport position: The cooling units must always be transported upright.
Waste disposal: The closed cooling circuit contains refrigerant and oil which must be correctly disposed of for the protection of the environment. Disposal can be carried out at
Rittal.
We reserve the right to make technical modifications.

11. Scope of supply and guarantee

1 cooling unit, ready for connection
1 drilling template
1 sealing tape
1 set of mounting and operating instructions
1 plug-in terminal strip

Guarantee:
This unit is covered by a 2-year guarantee from the date of supply, subject to correct usage (see also Safety notices under heading 4.). Within this period, the returned unit will be repaired in the factory or replaced free of charge. The cooling unit is to be used for the cooling of enclosures only. If it is connected or handled improperly the manufacturer's guarantee does not apply and in this case we are not liable for any damage caused.

12. Comfort control display screen and system analysis

Alarm no.	System message	Cause	Remedy
A01	Open the enclosure door	Door open or door limit switch not correctly positioned	Close door, position door limit switch correctly, check connection if necessary
A02	Internal temperature of enclosure too high	Cooling capacity too low/unit undersize Sequence errors in messages A03 to A17	Check cooling capacity
A03	Filter monitoring	Filter mat soiled	Clean or exchange
A04	Ambient temperature too high/too low	Ambient temperature outside the permissible operating range (+10°C to +60°C)	Raise or lower the ambient temperature (e.g. heat or ventilate the room)
A05	Icing hazard	Icing hazard display according to operating mode	Increase the nominal value of the internal enclosure temperature
A06	HD monitor	Ambient temperature too high	Unit operating limits exceeded
		Condenser soiled	Clean
		Filter mat soiled	Clean or exchange
		Condenser fan defective	Exchange
		E-valve defective	Repair by refrigeration engineer
		HD monitor fault	Refrigeration engineer to exchange
A07	Evaporator	Refrigerant fault	Repair by refrigeration engineer
A08	Condensate warning	Only in units with optional condensate evaporation	Check condensate drainage; repair kinks or blockages in the hose as necessary
A09	Condenser fan	Blocked or defective	Clear the blockage; exchange if necessary
A10	Condenser fan	Blocked or defective	Clear the blockage; exchange if necessary
A11	Compressor	Compressor overloaded (internal winding protection)	Unit switches in again independently
		Defective (check by measuring the winding resistance)	Refrigeration engineer to exchange
A12	Condenser temperature sensor	Open or short circuit	Exchange
A13	Ambient temperature sensor	Open or short circuit	Exchange
A14	Icing temperature sensor	Open or short circuit	Exchange
A15	Condensate warning temperature	Open or short circuit	Exchange
A16	Internal temperature sensor	Open or short circuit	Exchange
A17	Phase monitoring	Incorrect rotary field/phase absent	Exchange two phases
A18	EPROM error		
A19	LAN/Master-Slave	Master and slave not linked	Setting or check cable
A20	Voltage drop	Fault display is not illustrated	Event is saved in the log file
E0	Display signal	Connection problem (display and control board)	Reset by means of power supply (OFF/ON)
		Cable faulty; plug connection loose	Replacement of the boards
The fault displays A03, A06 and A07 are to be reset manually. To do this, hold down the ▲ and ▼ keys simultaneously for 5 seconds.			

13. Comfort control programming

Level	Display screen	Changeable parameter	min. value	max. value	Factory setting	Explanation
1	St	Nominal value of the internal enclosure	20	55	35	The nominal value of the internal enclosure temperature is set at the factory to 35°C and is variable over a 20°C range to 55°C.
2	Fi	Filter mat monitoring	10	40 (99 = off)	99	For activation of filter mat monitoring, the display is to be set to a minimum of 10 K above the temperature difference shown in programming mode “Fi”; filter mat monitoring is switched off at the factory. (Display 99 = off).
3	Ad	Master-slave programming	0	19	0	see 8.3 “Cooling unit programming”
4	CF	Temperature conversion	0	1	0	The temperature display can be switched from °C (0) to °F (1). The corresponding LED displays the current unit of temperature.
5	H1	Temperature switching	2	10	5	The cooling unit is set in the factory for a switching cycle of 5 K. This parameter should only be changed after agreement with the manufacturer.
6	H2	Difference for error message 2	3	15	5	If the internal enclosure temperature exceeds the set value by more than 5 K, then error message 2 (internal enclosure temperature too high) appears on the display terminal. The difference of 5 K can be changed if required over the range 3 K to 15 K.
7	A1	Relay connection	0	2	0	The fault messages (1 to 19) depicted in the display can also be evaluated using two potential-free fault message relays. Comfort control provides the option to group fault messages accordingly and assign them to both fault message relays. The value “1” is to be programmed for assignment and evaluation of the relevant fault message via relay 1. If the fault is to be evaluated via relay 2, then the value “2” is to be programmed accordingly. If the value is set to “0”, the system message appears only in the display. This accordingly enables the user to define the system weighting himself, by apportioning between relays 1 and 2.
8	A2	Relay connection	0	2	0	
9	A3	Relay connection	0	2	0	
10	A4	Relay connection	0	2	0	
11	A5	Relay connection	0	2	0	
12	A6	Relay connection	0	2	1	
13	A7	Relay connection	0	2	2	
14	A8	Relay connection	0	2	1	
15	A9	Relay connection	0	2	1	
16	A10	Relay connection	0	2	1	
17	A11	Relay connection	0	2	2	
18	A12	Relay connection	0	2	1	
19	A13	Relay connection	0	2	1	
20	A14	Relay connection	0	2	1	
21	A15	Relay connection	0	2	1	
22	A16	Relay connection	0	2	1	
23	A17	Relay connection	0	2	1	
24	A18	Relay connection	0	2	0	
25	A19	Relay connection	0	2	0	

D Anschlußschema Comfortcontroller

A1 = Leistungsplatine
A2 = Anzeigeterminal
A3 = Anlaßrelais und R–C Glied
B1 = Temperaturfühler Innentemperatur
B2 = Temperaturfühler Vereisungsschutz
B3 = Temperaturfühler außen 1
B4 = Temperaturfühler außen 2
B5 = Kondensatwarnsensor
C1-C4 = Betriebskondensatoren
F2 = Pressostat (bei 3302.3x0 kein Pressostat sondern Brücke)
F3 = Thermokontakt Verdichter
K1 = Relais Sammelstörung 1
K2 = Relais Sammelstörung 2
L1 = LED Betrieb grün
L2 = LED Alarm rot
M1 = Verdichter
M2 = Verflüssigerventilator
M4 = Verdampferventilator
R1 = Potentiometer zur Setpoint-Einstellung
S1 = Türendschalter (ohne Türendschalter Klemme 1, 2 offen)
T1 = Trafo
X1 = Hauptanschlußklemmleiste
X2 = Master/Slave-Anschluß
X3 = Optionale Schnittstelle
H1 = Kondensatverdunster (optional)

GB Wiring diagram comfort controller

A1 = Power PCB
A2 = Display terminal
A3 = Start-up relay and R–C component
B1 = Internal temperature sensor
B2 = Icing hazard temperature sensor
B3 = Temperature sensor, external 1
B4 = Temperature sensor, external 2
B5 = Condensate warning sensor
C1-C4 = Operating capacitors
F2 = Pressure-sensitive switch (in the 3302.3x0 no pressure-sensitive switch but a bridge)
F3 = Compressor thermal contact
K1 = Relay collective fault 1
K2 = Relay collective fault 2
L1 = Green operating LED
L2 = Red alarm LED
M1 = Compressor
M2 = Condenser fan
M4 = Evaporator fan
R1 = Setpoint adjustment potentiometer
S1 = Door limit switch (without door operated switch terminal 1, 2 open)
T1 = Transformer
X1 = Main terminal strip
X2 = Master/slave connection
X3 = Optional interface
H1 = Condensate evaporator (optional)

F Schéma électrique régulateur confort

A1 = Platine de puissance
A2 = Display terminal
A3 = Relais de démarrage temporisé
B1 = Sonde de température intérieure
B2 = Sonde de veille anti-givre
B3 = Sonde de température extérieure 1
B4 = Sonde de température extérieure 2
B5 = Avertisseur de condensats
C1-C4 = Condensateurs de régime
F2 = Pressostat (les modèles 3302.3x0 ne sont pas équipés de pressostat)
F3 = Contact bilame du compresseur
K1 = Relais défauts 1
K2 = Relais défauts 2
L1 = LED fonction – vert
L2 = LED alerte – rouge
M1 = Compresseur
M2 = Ventilateur du condenseur
M4 = Ventilateur de l'évaporateur
R1 = Potentiomètre pour l'étalonnage
S1 = Interrupteur de porte (en absence d'interrupteur bornes 1, 2 ouvertes)
T1 = Transformateur
X1 = Bornier principal
X2 = Port maître/esclave
X3 = Interface (option)
H1 = Evaporateur de condensats (en option)

NL Aansluitschema comfortcontroller

A1 = Hoofdstroomprint
A2 = Display
A3 = Startrelais en R–C-element
B1 = Temperatuursensor interne temp.
B2 = Temperatuursensor ijsvorming
B3 = Temperatuursensor buiten 1
B4 = Temperatuursensor buiten 2
B5 = Condens waarschuwingssensor
C1-C4 = Motorcondensator
F2 = Pressostaat (bij 3302.3x0 geen pressostaat maar brug)
F3 = Thermisch relais compressor
K1 = Relais verzamelstoring 1
K2 = Relais verzamelstoring 2
L1 = LED bedrijf, groen
L2 = LED alarm rood
M1 = Compressor
M2 = Condensorventilator
M4 = Verdamperventilator
R1 = Potmeter voor instellen gewenste waarde
S1 = Deurschakelaar (zonder deurschakelaar klem 1, 2 open)
T1 = Transformator
X1 = Hoofdaansluitklemmenstrook
X2 = Master/slave-aansluiting
X3 = Optionele interface
H1 = Condensaatverdamper (optioneel)

S Anslutningsschema comfortcontroller

A1 = Drivkort
A2 = Display terminal
A3 = Startrelä och R–C länk
B1 = Temperaturgivare innertemperatur
B2 = Temperaturgivare nedisningsrisk
B3 = Temperaturgivare yttre 1
B4 = Temperaturgivare yttre 2
B5 = Kondensvarningssensor
C1-C4 = Startkondensator
F2 = Pressostat (vid 3302.3x0 ingen pressostat utan bygling)
F3 = Termokontakt kompressor
K1 = Samlingsrelä felsignaler 1
K2 = Samlingsrelä felsignaler 2
L1 = LED drift grön
L2 = LED alarm röd
M1 = Kompressor
M2 = Kondensorfläkt
M4 = Förångarfläkt
R1 = Potentiometer för setpoint-inställning
S1 = Dörrströmbrytare (utan dörrströmbrytarklämma 1, 2 öppna)
T1 = Trafo
X1 = Huvudkontaktplint
X2 = Master/Slave-anslutning
X3 = Optional anslutning
H1 = Kondensavdunstare (tillval)

I Schema allacciamenti controllore Comfort

A1 = Scheda di potenza
A2 = Display terminale
A3 = Relais di avviamento
B1 = Sonda temperatura interna
B2 = Sonda temperatura, pericolo di formazione di ghiaccio
B3 = Sonda temperature esterna 1
B4 = Sonda temperature esterna 2
B5 = Sensore allarme condensa
C1-C4 = Condensatore d'esercizio
F2 = Pressostato (se 3302.3x0 nessun pressostato bensì ponte)
F3 = Contatto termico compressore
K1 = Relè segnalatore guasti 1
K2 = Relè segnalatore guasti 2
L1 = LED esercizio verde
L2 = LED allarme rosso
M1 = Compressore
M2 = Ventilatore del condensatore
M4 = Ventilatore dell'evaporatore
R1 = Potenziometro per setpoint
S1 = Interruttore della portina (senza interruttore i morsetti 1, 2 sono aperti)
T1 = Trasformatore
X1 = Morsettiera a raccordo principale
X2 = Raccordo Master/Slave
X3 = Interfaccia opzione
H1 = Evaporatore di condensa (opzionale)

E Esquema de conexiones del controlador Confort

A1 = Pletina de potencia
A2 = Pantalla indicadora
A3 = Relé de arranque y fusible R–C
B1 = Sonda térmica de la temp. en el interior del armario
B2 = Sonda térmica protección contra congelación
B3 = Sonda térmica exterior 1
B4 = Sonda térmica exterior 2
B5 = Sensor de condensación
C1-C4 = Condensador electrolitico de servicio
F2 = Presostato (en 3302.3x0 sin presostato sino puente)
F3 = Contacto térmico compresor
K1 = Relé de fallo 1
K2 = Relé de fallo 2
L1 = LED servicio verde
L2 = LED alarma rojo
M1 = Compresor
M2 = Ventilador del condensador
M4 = Ventilador del evaporador
R1 = Potenciómetro para ajuste de valores
S1 = Interruptor de puerta (sin interruptor final borne 1, 2 abierto)
T1 = Transformador
X1 = Regleta de bornes principal
X2 = Conexión maestro/esclavo
X3 = Interfaz opcional
H1 = Evaporador de condensado (opcional)

J 配線図

A1 = 電源基板
A2 = ディスプレイターミナル
A3 = 起動リレー と RC
B1 = 温度センサー 内部温度
B2 = 温度センサー 凍結防止
B3 = 温度センサー 外部温度 1
B4 = 温度センサー 外部温度 2
B5 = 凝縮水センサー
C1 – C4 = コンデンサー
F2 = 圧力スイッチ (3302,3x0 は 圧力スイッチなし。ブリッヂのみ)
F3 = サーマルスイッチ 圧縮機
K1 = リレー 異常時外部出力 1
K2 = リレー 異常時外部出力 2
L1 = LED 運転 (緑)
L2 = LED アラーム (赤)
M1 = 圧縮機
M2 = 凝縮器ファン 1
M3 = 凝縮器ファン 2
M4 = 蒸発器ファン
R1 = 設定温度調整用つまみ
S1 = ドアスイッチ (非接続時、端子 1 と 2 はオープン)
T1 = トランス
X1 = 主端子台
X2 = マスター/スレーブ接続
X3 = オプション用インタフェース
H1 = 凝縮水蒸発器 (メーカーオプション)

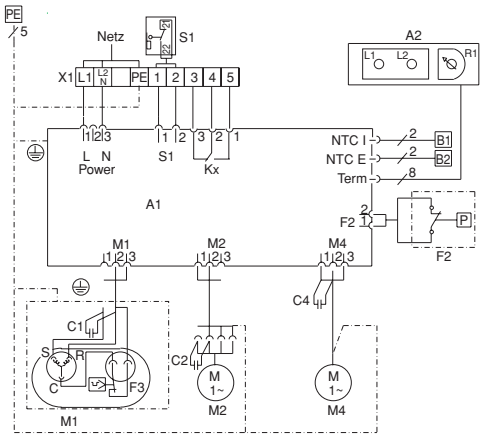
Anschlußschema
Wiring diagram
Schéma électrique
Aansluitschema
Anslutningsschema
Schema allacciamenti
Esquema de conexiones
配線図

Kontaktdaten K1/K2/KX
Contact Data K1/K2/KX
Caracteristiques des contacts K1/K2/KX
Kontaktgegevens K1/K2/KX
Kontaktdata K1/K2/KX
Caratteristiche dei contatti K1/K2/KX
Características del contacto K1/K2/KX
K1/K2/KX の接点データ

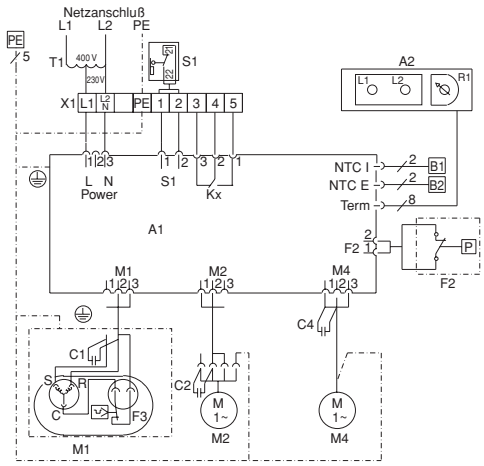
AC cosf = 1	DC L/R = 20 ms
I max. = 2 A U max. = 250 V	I min. = 100 mA U max. = 200 V I max. = 2 A U max. = 18 V I max. = 2 A

Technische Daten siehe Typenschild
Technical data see name plate
Données techniques voir plaque signalétique
Technische gegevens zie typenplaatje
Tekniska data se typskylt
Caratteristiche tecniche vedi targhetta
Datos técnicos véase placa de características
仕様は銘板を確認してください。

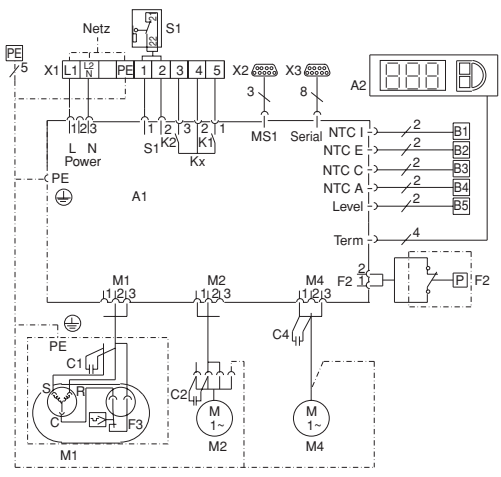
SK 3302.300 / .310
SK 3361.100 / .110, SK 3361.200 / .210



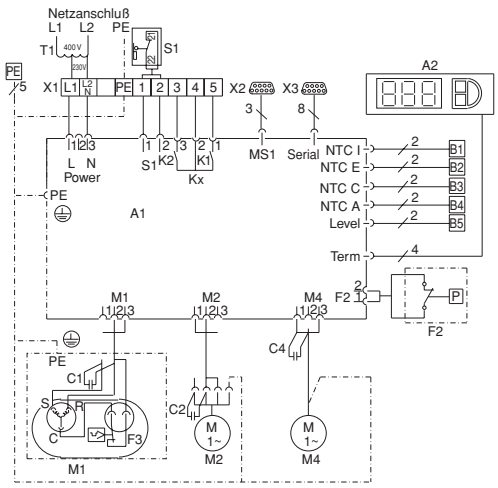
SK 3361.140, SK 3361.240



SK 3361.500 / .510, SK 3361.600 / .610



SK 3361.540, SK 3361.640



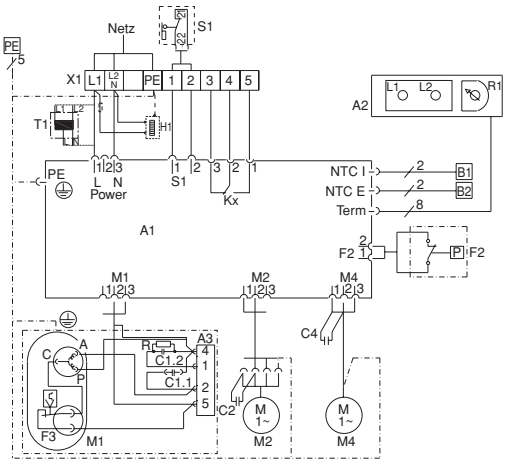
Anschlußschema
Wiring diagram
Schéma électrique
Aansluitschema
Anslutningsschema
Schema allacciamenti
Esquema de conexiones
配線図

Kontaktdaten K1/K2/KX
Contact Data K1/K2/KX
Caracteristiques des contacts K1/K2/KX
Kontaktgegevens K1/K2/KX
Kontaktdata K1/K2/KX
Caratteristiche dei contatti K1/K2/KX
Características del contacto K1/K2/KX
K1/K2/KX の接点データ

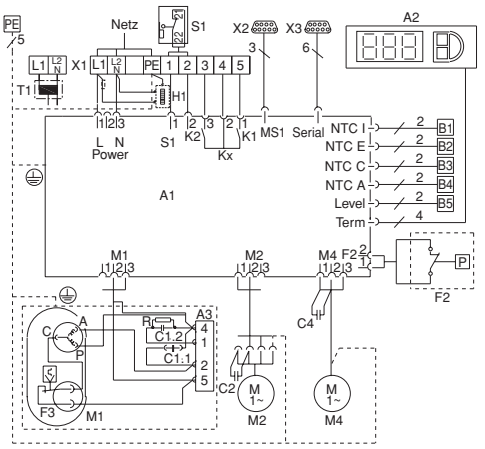
AC cosf = 1	DC L/R = 20 ms
I max. = 2 A U max. = 250 V	I min. = 100 mA U max. = 200 V I max. = 2 A U max. = 18 V I max. = 2 A

Technische Daten siehe Typenschild
Technical data see name plate
Données techniques voir plaque signalétique
Technische gegevens zie typenplaatje
Tekniska data se typskylt
Caratteristiche tecniche vedi targhetta
Datos técnicos véase placa de características
仕様は銘板を確認してください。

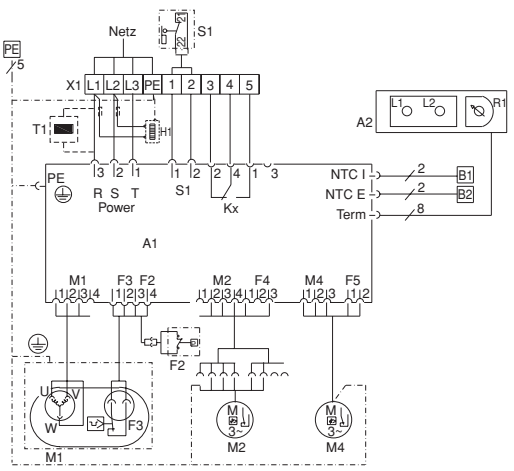
SK 3366.10x/ .11x, SK 3366.20x / .21x
SK 3377.10x / .11x, SK 3377.20x / .21x
x = 0 bzw. 1



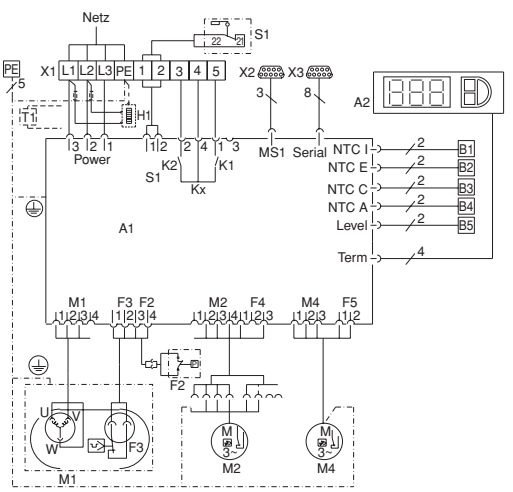
SK 3366.50x / .51x, SK 3366.60x / .61x
SK 3377.50x / .51x, SK 3377.60x / .61x
x = 0 bzw. 1



SK 3366.14x / .24x, SK 3377.14x / .24x
x = 0 bzw. 1



SK 3366.54x / .64x, SK 3377.54x / .64x
x = 0 bzw. 1



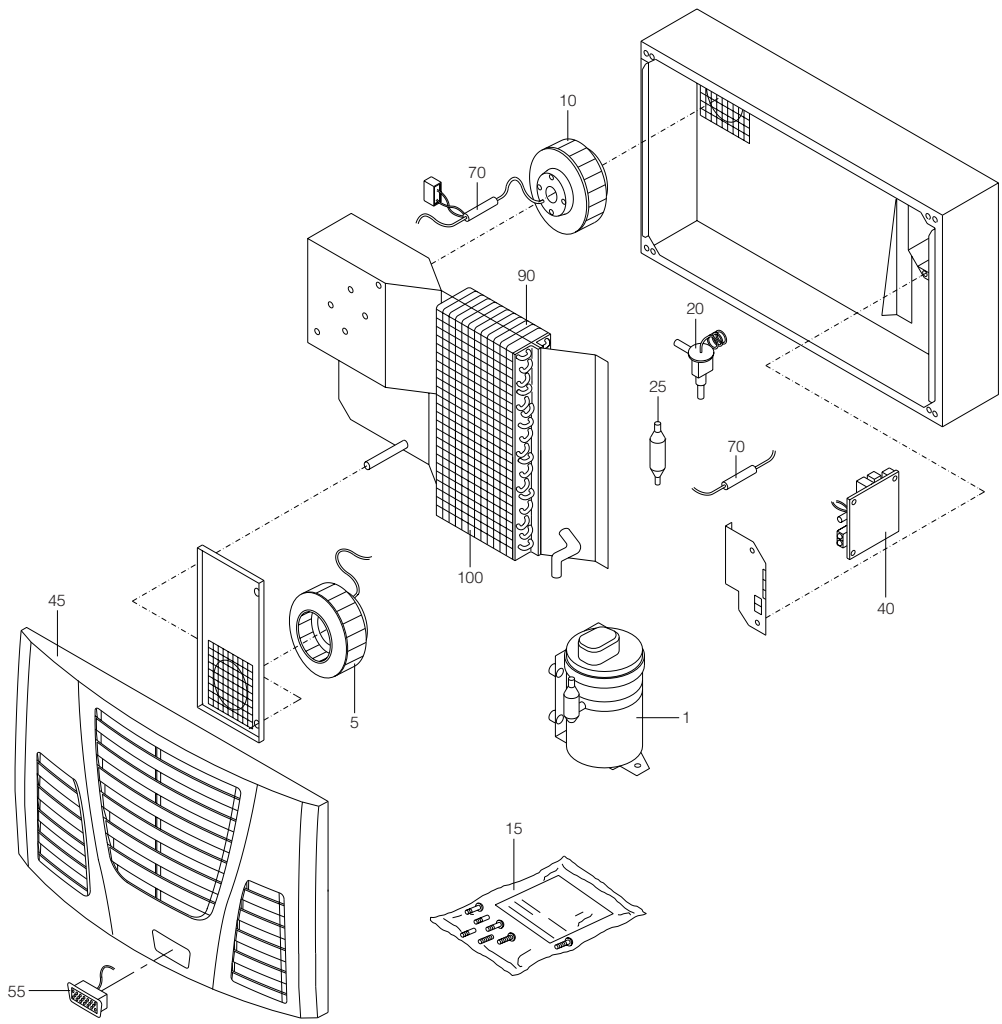
Position Item Pos. Pos. Pos. Pos. Posición	**Ersatzteil-liste** **D**	**Spares list** **GB**	**Liste de pièces détachées** **F**	**Lijst reserve-delen** **NL**	**Reserv-delslista** **S**	**Lista dei pezzi di ricambio** **I**	**Lista de piezas de repuesto** **E**	**スペアパーツ一覧表** **J**
	Bezeichnung	Description	Signification	Benaming	Benämning	Descrizione	Descripción	名称
1	Verdichter	Compressor	Compresseur	Kompressor	Kompressor	Compressore	Compresor	圧縮機（コンプレッサー）
5	Verflüssiger-ventilator	Condensing fan	Ventilateur du condenseur	Condensor-ventilator	Kondensorfläkt	Ventilatore del condensatore	Ventilador del condensador	凝縮器ファン
10	Verdampfer-ventilator	Evaporator fan	Ventilateur de l'évaporateur	Verdamper-ventilator	Förångarfläkt	Ventilatore dell'evaporatore	Ventilador del evaporador	蒸発器ファン
15	Versandbeutel	Dispatch bag	Pochette d'accessoires	Zakje toebehoren	Tillbehörspåse	Sacchetto accessori	Bolsa de accesorios	標準アクセサーリキット
20	Expansionsventil	Expansion valve	Soupape de détente	Expansieventiel	Expansionsventil	Valvola d'espansione	Válvula de expansión	膨張弁
25	Filtertrockner	Filter dryer	Assècheur de filtre	Filterdroger	Filtertork	Filtro essicatore	Secador del filtro	フィルタドライヤー
30	PSA^H-Wächter	PSA^H monitor	Témoin pression PSA^H	PSA^H-pressostaat	PSA^H-vakt	Controllo PSA^H	Presostato PSA^H	圧力スイッチ
40	Controller-Box	Controller box	Processeur box	Controller E-box	Kontroll box	Box controller	Carcasa controlador	制御基板
45	Lamellengitter 1	Louvred grille 1	Grille à lamelles 1	Rooster 1	Lamellgaller 1	Griglia a lamelle 1	Rejilla 1	プラスチックルーバー 1
46	Lamellengitter 2	Louvred grille 2	Grille à lamelles 2	Rooster 2	Lamellgaller 2	Griglia a lamelle 2	Rejilla 2	プラスチックルーバー 2
50	Abdeckblende	Infill panel	Plastron	Afdekplaat	Täckplåt	Copertura cieca	Pantalla cubierta	センターカバー
55	Anzeige	Display	Affichage	Display	Display	Comando	Indicación	ディスプレイ
65	Folientastatur	Membrane keyboard	Clavier membrane	Folietoetsenbord	Folietangenter tryckknappar	Tastiera a membrana	Teclado de membrana	タッチパネル
66	Abdeckfolie	Covering membrane	Feuille de recouvrement	Afdekfolie	Täckfolie	Lamina di copertura	Lámina cubierta	**タッチパネル用フィルムカバー**
71	Temperaturfühler	Temperature sensor	Sonde de température	Temperatuur-sensor	Temperaturgivare	Sonda di temperatura	Sonda térmica	温度センサ
75	Haube	Cover	Couvercle	Afdekkap	Huv	Calotta	Capucha	カバー
80	Transformator	Transformer	Transformateur	Trafo	Trafo	Trasformatore	Transformador	トランス
90	Verdampfer	Evaporator	Evaporateur	Verdamper	Förångare	Evaporatore	Evaporador	蒸発器（エバポレーター）
100	Verflüssiger	Condenser	Condenseur	Condensor	Kondensor	Condensatore	Condensador	凝縮器
101	Kondensat-verdunster	Condensate evaporator	Evaporateur de condensats	Condensaat-verdamper	Kondensavdunstare	Evaporatore di condensa	Evaporador de condensado	**凝縮水蒸発器**

Bei Bestellung unbedingt angeben
Typ:
Fabrikations-Nr.:
Herstelldatum:
Ersatzteil-Nr.:

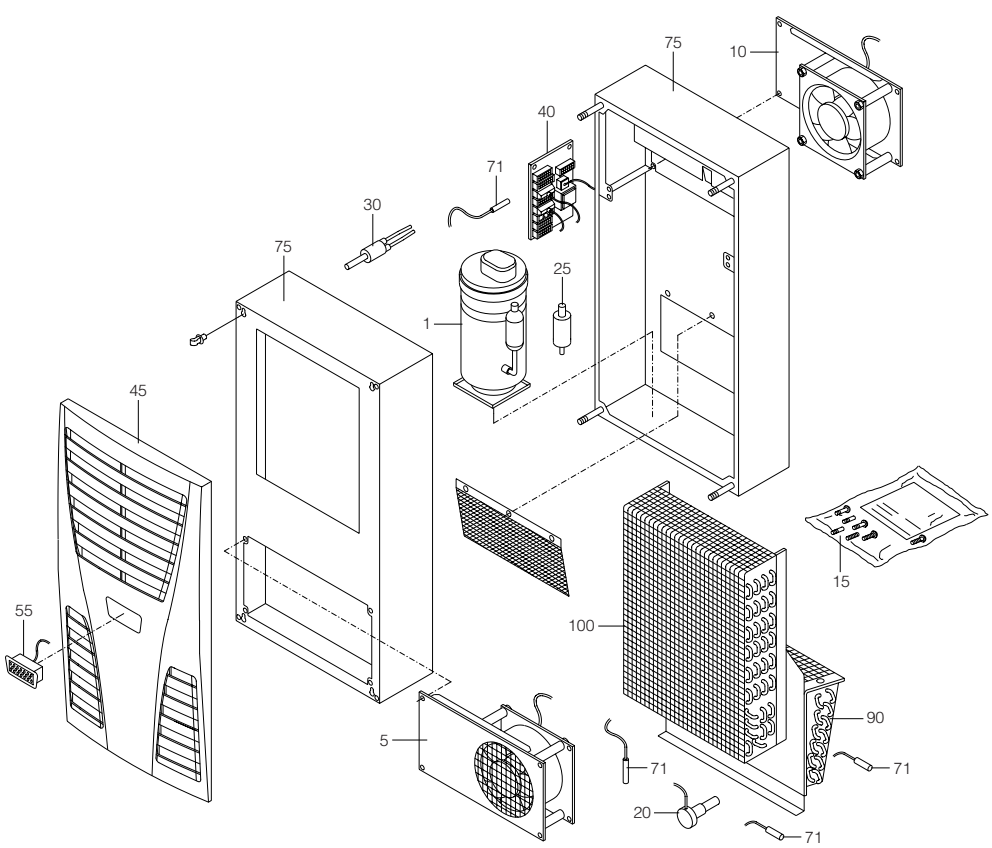
Absolutely necessary in case of order
Type:
Fabrication no.:
Manufacturing date:
Spare part no.:

スペアパーツのご発注時に、必ずご記入ください。
製品番号： SK
製造番号：
製造日時：
スペアパーツ番号：

SK 3302.300 / .310



SK 3361.xxx



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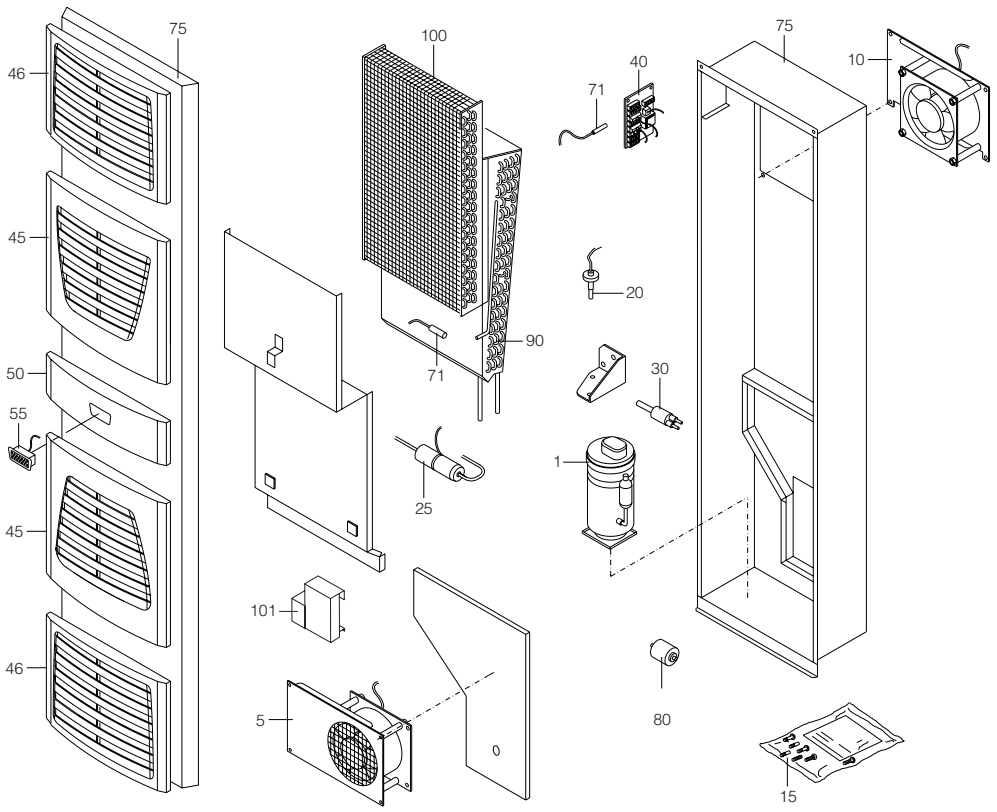
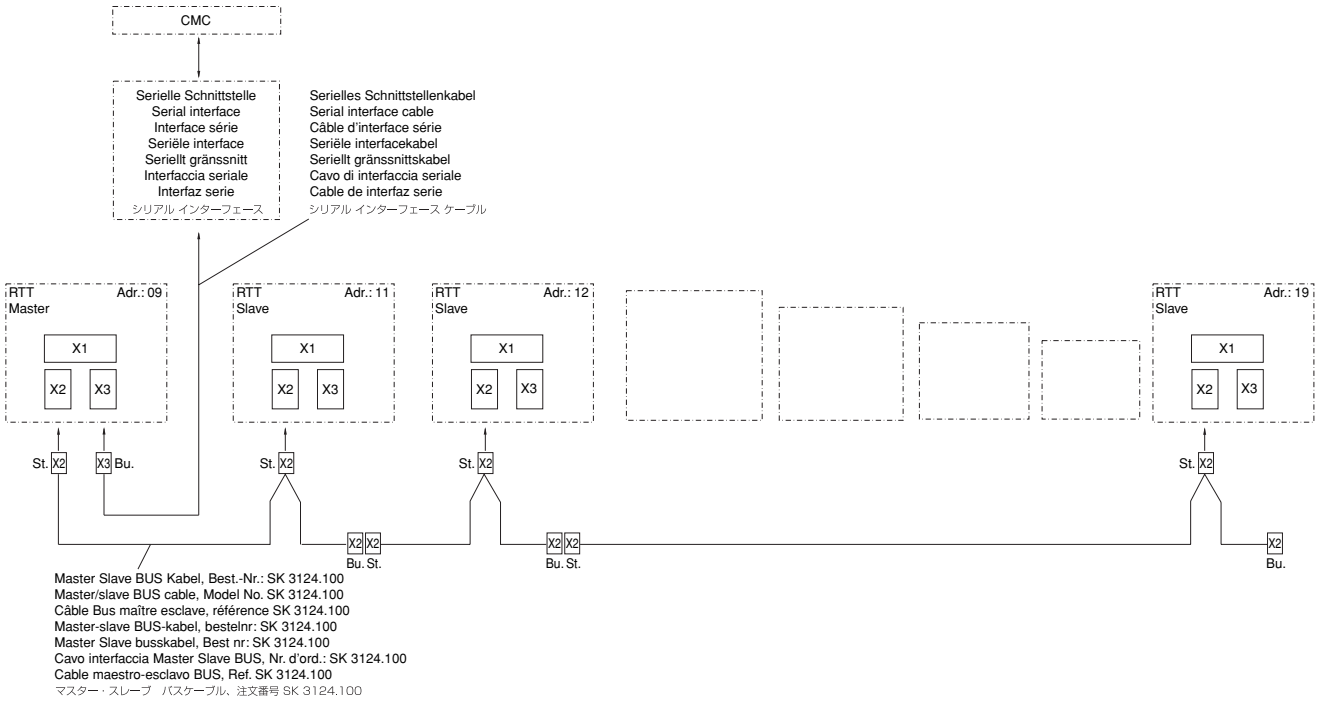


Anschlußbeispiel: Master-Slave-Betrieb
Connection example: Master/slave operation
Schéma d'installation typique : régime maître-esclave
Aansluitvoorbeeld: master-slave functie
Uppkopplingsexempel: Master-Slave installation
Esempi di connessione: funzione Master-Slave
Ejemplo de conexión: Funcionamiento maestro-esclavo
マスター・スレーブ運転の接続例



D

Beschreibung
Die Adresse des Masters ist abhängig von der Anzahl der angeschlossenen Slave-Geräte (09 = Master mit 9 Slave-Geräten). Die Adresse eines Slave-Gerätes beginnt immer mit der 1. Die 2. Zahl stellt die eigentliche Adressierung dar. Maximal können 9 Slave-Geräte an einer Master-Einheit betrieben werden, wobei jedes Gerät Master sein kann. Maximale Gesamtlänge aller anzubindenden Geräte 50 m. Es können 1-phasige und 3-phasige Geräte angeschlossen werden.
RTT = Rittal TopTherm Kühlgeräte
X1 = Netzanschluß/Türendschalter/Alarme
X2 = Master-Slave-Anschluß SUB-D 9-polig
X3 = Serielle Schnittstelle SUB-D 9-polig
St. = Stecker SUB-D 9-polig
Bu. = Buchse SUB-D 9-polig

GB

Description
The address of the master depends on the number of attached Slave units. (09 = master connected with 9 Slave units). The address of the Slaves starts with 1. The 2nd number represents the address of the Slave unit. Max. 9 Slave units can be connected to one master unit. Maximum length of the Master/Slave LAN all over is 50 m. Cooling units with different voltages can be connected in a Master/Slave Network.
RTT = Rittal TopTherm cooling units
X1 = AC power supply/door switch/alarms
X2 = Master Slave connection SUB-D 9-pole
X3 = Serial Interface SUB-D 9-pole
St. = Plug SUB-D 9-pole
Bu. = Jack SUB-D 9-pole

F

Description
L'adresse de l'appareil maître dépend du nombre d'appareils asservis qui y sont raccordés (09 = appareil maître connecté à 9 appareils asservis). L'adresse d'un appareil asservi commence toujours par le chiffre 1. Le deuxième chiffre représente l'adresse de l'appareil esclave. Chaque appareil peut occuper la fonction d'appareil maître. Et chaque unité maître permet de raccorder 9 unités esclaves au maximum. La longueur totale maximale du réseau maître/esclaves est de 50 m. Il est possible de connecter des appareils de refroidissement de voltages différents (monophasés et triphasés) dans un réseau maître/esclaves.
RTT = Climatiseurs TopTherm de Rittal
X1 = Raccordement au secteur/interrupteur de porte/alarmes
X2 = Raccordement maître/esclave SUB-D 9 pôles
X3 = Interface série SUB-D 9 pôles
St. = Fiche SUB-D 9 pôles
Bu. = Prise SUB-D 9 pôles

NL

Beschrijving
Het adres van de master is afhankelijk van het aantal aangesloten slave aggragaten (09 = master met 9 slaves). De adressen van de slave aggregaten beginnen altijd met een 1. Het getal 2 komt overeen het het aantal werkelijke adressen. Maximaal kunnen er 9 slave aggregaten en 1 master geconfigureerd worden, waarbij elke aggregaat de master kan zijn. De maximale lengte van alle gekoppelde aggregaten bedraagt 50 m. Er kunnen 1- en 3-fasen aggregaten worden aangesloten.
RTT = Rittal TopTherm koelaggregaten
X1 = Netaansluiting/deurschaklaar/Alarm
X2 = Master-slave aansluiting SUB-D 9-polig
X3 = Seriële interface SUB-D 9-polig
St. = Connector SUB-D 9-polig
Bu. = Bus SUB-D 9-polig

S

Beskrivning
Master-aggregatets adress är beroende på antalet anslutna Slave-aggregat (09 = Master med 9 Slave-agg.). Slave-aggregatets adress börjar alltid med 1. Den 2. siffran visar slave-enhetens adress.
Maximalt 9 Slave-aggregat kan kopplas upp till en master, varvid varje aggregat kan vara master. Maximal längd av denna Master-Slave LAN är 50 m. Aggregat med olika spänningar kan kopplas upp i nätet.
RTT = Rittal TopTherm kylaggregat
X1 = Nätanslutning/dörrströmbrytare/larm
X2 = Master-Slave anslutning 9-polig D-Sub
X3 = Seriellt gränssnitt 9-polig D-Sub
St. = Stiftdon 9-polig D-Sub
Bu. = Hylsdon 9-polig D-Sub

I

Descrizione
L'indirizzo del Masters dipende dalla quantità di apparecchi Slave collegati (09 = Master con 9 apparecchi). L'indirizzo di un apparecchio Slave comincia sempre con «1». La seconda cifra corrisponde al vero e proprio indirizzo. E' possibile azionare max. 9 apparecchi Slave su di un'unità Master, laddove ci sia un apparecchio Master. La lunghezza massima totale di tutti gli apparecchi collegati è di 50 m. E' possibile collegare apparecchi monofase e trifase.
RTT = Condizionatore Rittal TopTherm
X1 = Allacciamento di rete/Interruttore porta/Allarme
X2 = Connessione Master-Slave SUB-D 9-poli
X3 = Interfaccia seriale SUB-D 9-poli
St. = Presa SUB-D 9-poli
Bu. = Connettore SUB-D 9-poli

E

Descripción
La dirección del esclavo depende de la cantidad de aparatos esclavos conectados (09 = maestro con 9 aparatos esclavo). La dirección de un aparato esclavo siempre empieza por 1. El número 2 representa la dirección propia. Una unidad maestro no puede gestionar más de 9 aparatos esclavo, cualquier aparato puede ser maestro. La longitud total máxima de todos los aparatos a conectar es de 50 m. Pueden conectarse aparatos de una y tres fases.
RTT = Refrigeradores TopTherm de Rittal
X1 = Conexión a red/Interruptor de puerta/Alarmas
X2 = Conexión maestro-esclavo SUB-D 9 polos
X3 = Interfaz serie SUB-D 9 polos
St. = Conector SUB-D 9 polos
Bu. = Casquillo SUB-D 9 polos

J

説明
マスターユニットのアドレス（Adr.）は、接続されているスレーブユニットの数によって決まります（09 は、9台のスレーブがつながっている場合です）。スレーブユニットのアドレスはいつも1で始まり、2桁目の数字がスレーブユニットを識別する番号になります。1台のマスターユニットに対して、合計9台のスレーブを接続できます。どのユニットをマスターとして選んでもかまいません。ケーブルの長さは、合計で50 m 以内に抑えてください。単相式ユニットと三相式ユニットをつなげることもできます。
RTT = リタール トップ サーモ クーリングユニット
X1 = 電源接続、ドアスイッチ、異常出力
X2 = マスター・スレーブ接続 SUB-D 9ピン
X3 = シリアル インターフェース SUB-D 9ピン
St. = プラグ SUB-D 9ピン
Bu. = ソケット SUB-D 9ピン

Verdrahtungsbeispiel: Türendschalter und Master-Slave-Betrieb

Wiring example: Door limit switch and master/slave operation

Schéma de câblage typique : Interrupteur de porte et régime maître-esclave

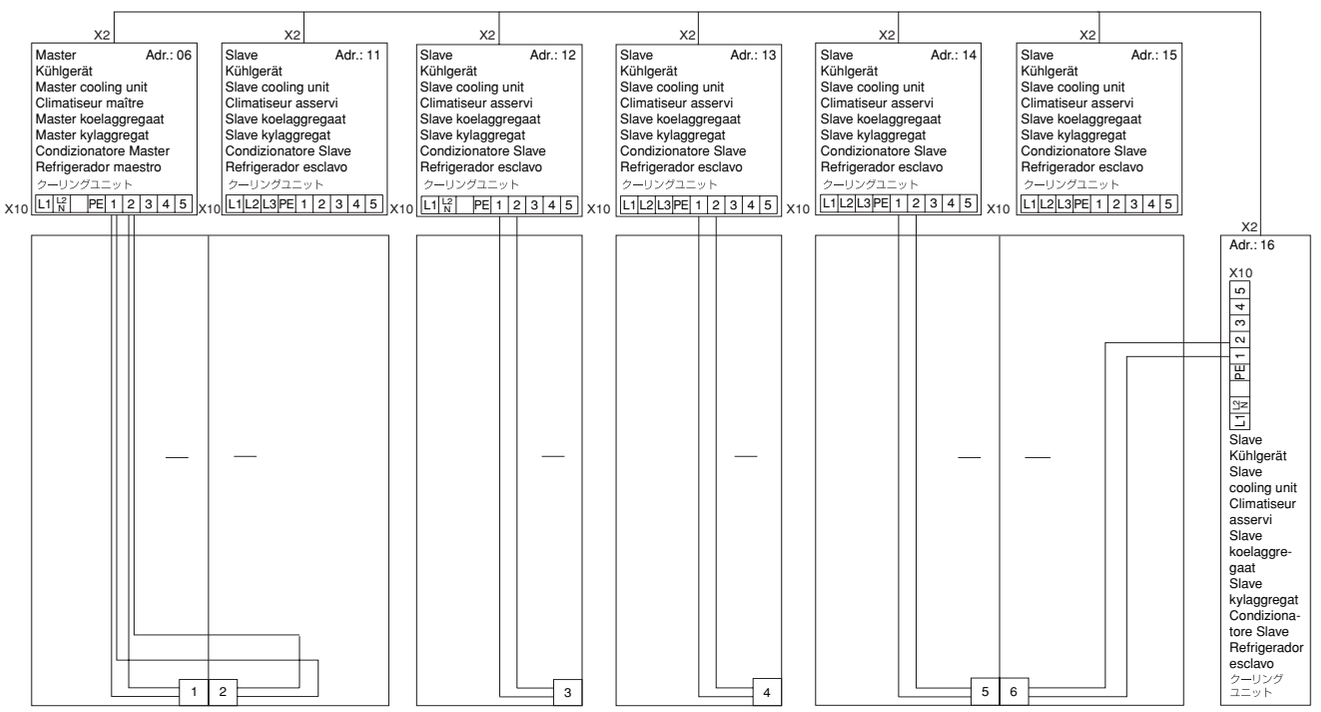
Bekabelingsvoorbeeld: deurschakelaar en master-slave functie

Kopplingsexempel: Dörrströmbrytare och Master-Slavedrift

Esempio di cablaggio: interruttore porta e Funzione Master-Slave

Ejemplo de conexión: Funcionamiento maestro-esclavo

ドアスイッチとマスター・スレーブ運転の配線例



Schaltschrank 2-türig mit zwei Türendschaltern
2-door enclosure with two door limit switches
Armoire électrique à deux portes avec deux interrupteurs de porte
Dubbeldeursschakelkast en twee deurschakelaars
Tvådörrars apparatskåp med 2 dörrströmbrytare
Armadio doppia porta con due interruttori porta
Armario de distribución de 2 puertas con dos interruptores de puerta
両開き扉付きエンクロージャーにドアスイッチ2個取付き

Schaltschrank mit Türendschaltern
Enclosure with door limit switches
Armoire électrique avec interrupteurs de porte
Schakelkast met deurschakelaars
Apparatskåp med dörrströmbrytare
Armadio con interruttore porta
Armario de distribución con interruptor de puerta
ドアスイッチ付きエンクロージャー

Schaltschrank mit Türendschaltern
Enclosure with door limit switches
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両開き扉付きエンクロージャーにドアスイッチ2個取付き

Slave Kühlgerät
Slave cooling unit
Climatiseur asservi
Slave koelaggregaat
Slave kylaggregat
Condizionatore Slave
Refrigerador esclavo
クーリングユニット

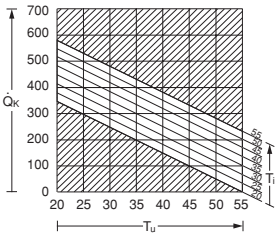
Kennlinienfeld (DIN 3168)
Performance diagram
Diagramme aéraulique
Karakteristiek
Effektdiagram
Diagramma delle potenze
Diagrama de potencia
性能線図

$\dot{Q}_K$ = Dauer-Nutzkühlleistung (W)
Cooling output
Puissance frigorifique utilisée
Nuttig koelvermogen
Kyleffekt
Potenza frigorifera utile
Potencia útil de refrigeración
連続有効冷却能力

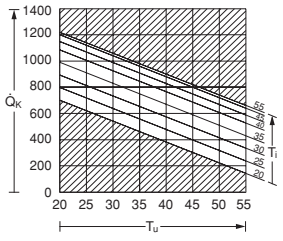
T_i = Schaltschrank-Innentemperatur (°C)
Enclosure internal temperature
Température intérieure de l'armoire
Temperatuur in de kast
Temperatur inne i skåpet
Temperatura interna dell'armadio
Temperatura interior del armario de mando
内部温度（蒸発器入口温度）

T_u = Umgebungstemperatur (°C)
Ambient temperature
Température ambiante
Omgevingstemperatuur
Omgivningstemperatur
Temperatura ambiente
Temperatura ambiente
外部温度（凝縮器入口温度）

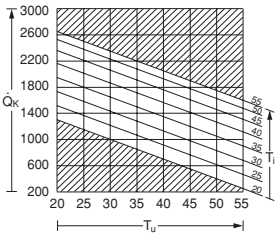
Kennlinienfeld SK 3302.... (DIN 3168) (50 Hz)



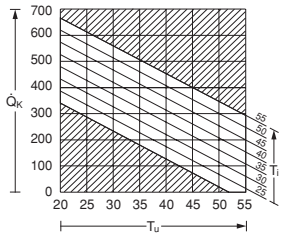
Kennlinienfeld SK 3361.... (DIN 3168) (50 Hz)



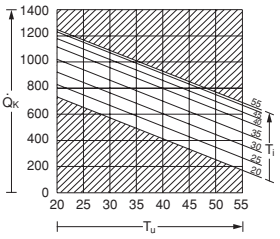
Kennlinienfeld SK 3366.... / SK 3377.... (DIN 3168) (50 Hz)



Kennlinienfeld SK 3302.... (DIN 3168) (60 Hz)



Kennlinienfeld SK 3361.... (DIN 3168) (60 Hz)



Kennlinienfeld SK 3366.... / SK 3377.... (DIN 3168) (60 Hz)

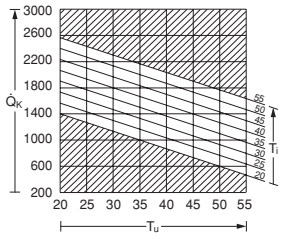


Diagramm 13.1: Programmierung

Diagram 13.1: Programming

Diagramme 13.1 : Programmation

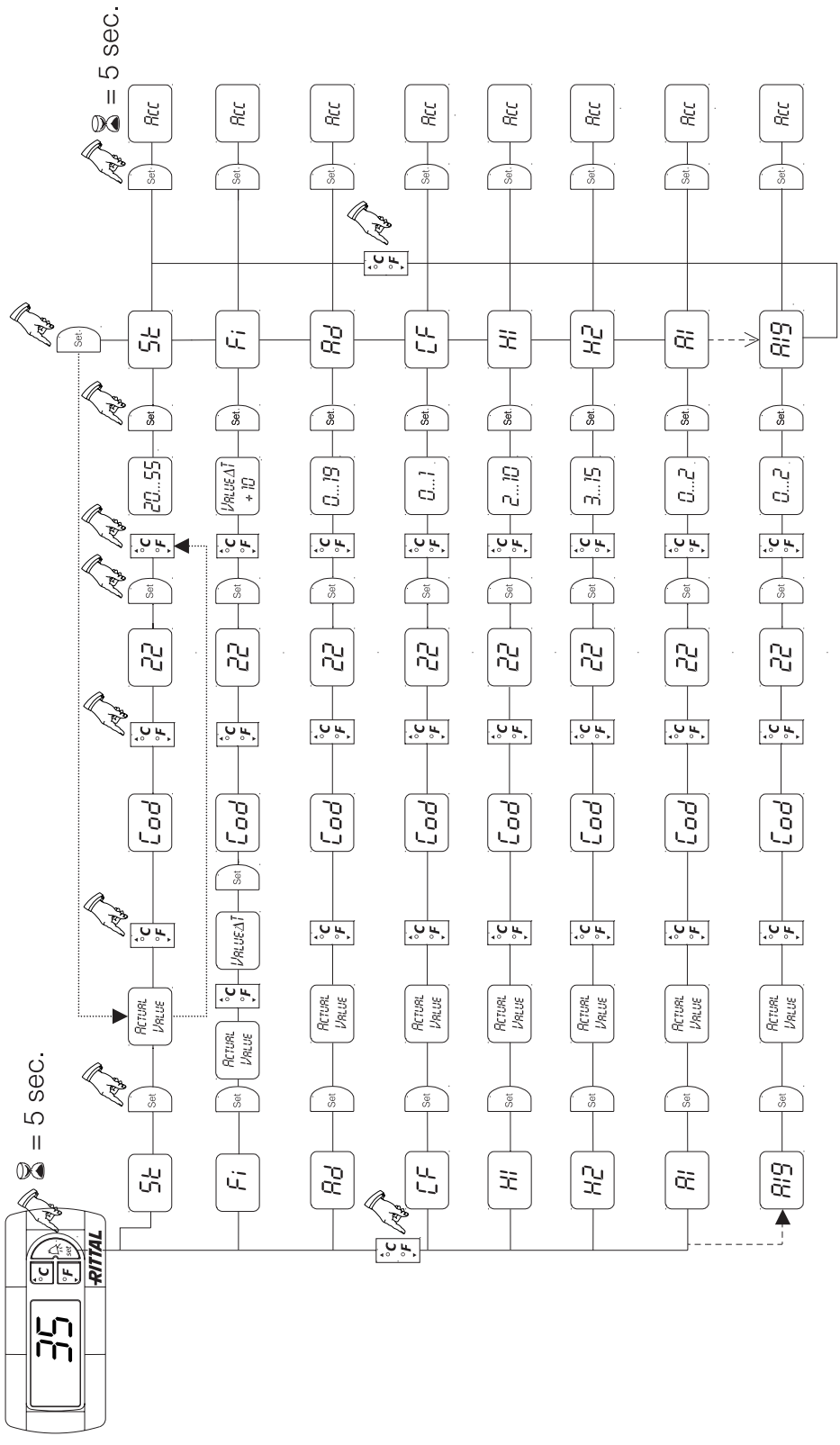
Diagram 13.1: Programmering

Diagram 13.1: Programering

Diagramma 13.1: Programmazione

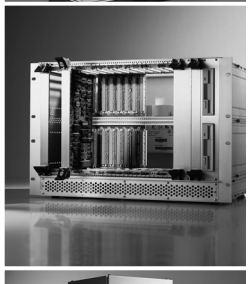
Diagrama 13.1: Programación

13.1　プログラミング・ダイヤグラム



Schaltschrank-Systeme
Industrial enclosures
Coffrets et armoires électriques
Kastsystemen
Apparatskåpssystem
Armadi per quadri di comando
Sistemas de armarios
インダストリアル エンクロージャー

Stromverteilung
Power distribution
Distribution de courant
Stroomverdelingscomponenten
Strömfördelning
Distribuzione di corrente
Distribución de corriente
分電・配電システム



Elektronik-Aufbau-Systeme
Electronic packaging
Electronique
Electronic Packaging Systems
Electronic Packaging
Contenitori per elettronica
Sistemas de montaje para la elettronica
エレクトロニクス パッケージシステム

System-Klimatisierung
System climate control
Climatisation
Systeemklimatisering
Systemklimatisering
Soluzioni di climatizzazione
Climatización de sistemas
温度管理システム

IT-Solutions
IT solutions
Solutions IT
Informatie en Communicatie Technologie
IT-lösningar
Soluzioni per IT
Soluciones TI
ITソリューション

Communication Systems
Communication systems
Armoires outdoor
Outdoor-behuizingen
Communication Systems
Soluzioni outdoor
Sistemas de comunicación
コミュニケーションシステム

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Umschalten auf Perfektion RITTAL

2. Aufl.
12/05
(10/04)